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HEADQUARTERS
UNITED STATES CONTINENTAL ARMY COMMAND
FORT MONROE, VIRGINIA

ATDEV-6 422 17 August 1961

SUBJECT: Report of Test, Project No. AVN 2961, "Evaluation of M-17 Protective Mask"

TO: Chief of Research and Development
Department of the Army
Washington 25, D. C.

XEROX

1. Reference is made to:

a. Letter, ATDEV-6 452.1, Hq USCONARC, 24 October 1960, subject: "Project Nr AVN 5060, 'Abbreviated Service Test of the Helicopter-Mounted Irritant-Gas Dispenser, E16R1".

b. Letter, ATDEV-6 422, Hq USCONARC, 23 Jan 1961, subject: "Report of Test, Project Nr AVN 661, "Service Test of Helicopter Pilot's Protective Mask Type E-75R3".

2. Attached is the US Army Aviation Board Report of Test, Project No. AVN 2961, "Evaluation of M-17 Protective Mask."

3. The conclusions and recommendations of the President, US Army Aviation Board are concurred in. It is further recommended that the appropriate technical service be directed to furnish a modified E 75R3 Protective Mask for confirmatory testing by the US Army Aviation Board.

FOR THE COMMANDER:

JOHN D. BRADY
Major, AGC
Asst Adjutant General

1 Incl
Report of Test, Project
No AVN 2961, ATEG-SEC
AVN 2961, USA Avn Bd,
24 Jul 61, subj as abv

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UNITED STATES ARMY AVIATION BOARD
Fort Rucker, Alabama

ATBG-SEC AVN 2961 24 JUN 1961

SUBJECT: Report of Test, Project No. AVN 2961, "Evaluation of M-17 Protective Mask"

TO: Commanding General
United States Continental Army Command
ATTN: Dep CofS for MD
Fort Monroe, Virginia

1. AUTHORITY.

a. Directive. Letter, ATDEV-6 422, Headquarters, United States Continental Army Command, 19 January 1961, subject: "Evaluation of Protective Mask M-17."

b. Purpose. To conduct an evaluation of the M-17 Protective Mask to determine suitability for interim use by Army aviators and aircraft crew members.

2. BACKGROUND.

a. General. A requirement exists for a CBR protective mask which is compatible with other personal equipment worn by Army aviators and aircraft crew members in the performance of their duties. As evidenced by correspondence between Chemical Corps representatives and Headquarters, USCONARC, a requirement for such a protective mask for use by Army aviators in the event of toxicological warfare was recognized in 1955. In view of the desirability of limiting the number of specialized respiratory protective devices in the supply system, USCONARC, Board No. 6 was directed to conduct an evaluation of standard and developmental protective masks for possible use by Army aviators. Board No. 6 conducted in-flight tests on three candidate masks, the M9A1 Field Protective Mask, the M14 Tank Protective Mask, and a Developmental Mask (Mask, Protective, Tank, M-14, which was modified with a nose-cup integrated with a microphone) later designated the E-75 Protective Mask. As a result of the tests, USCONARC recommended that: (1) The Developmental Mask be considered the most suitable of the three masks tested for use by Army aviators, and (2) the Developmental Mask be considered suitable for use by Army aviators when further modified to provide a microphone compatible with the AN/ARC-44 aircraft radio.

b. Development of the E-75 Mask resulted in the E-75R3 Protective Mask and E-34 Hood which was designed to be compatible with the APH-5 Helmet. This Board service tested the E-75R3 Mask and the E-34 Hood and found them unsuitable for use by Army aviators when the APH-5 Helmet is worn, and recommended that no further consideration be given to the combination of the E-75R3 and E-34 with the APH-5 (reference 8b).

c. With the acceptance of the M-4 Helicopter-Mounted Irritant-Gas Disperser as a suitable equipment item, an immediate operational requirement was created for a helicopter pilot's and air crew-member's protective mask. Subsequent to receipt of the test directive (paragraph 1), USCONARC directed that evaluation of the M-17 be limited to the conditions encountered when using the gas disperser.

d. The M-17 Protective Mask was received for evaluation by this Board on 28 March 1961. A maintenance package was not received.

3. DESCRIPTION OF MATERIEL. The M-17 Mask Assembly includes the mask, carrier, two lens outserts, and an anti-dim set.

a. The mask consists of:

(1) The faceblank in two sizes: small and medium.

(2) The nosecup in two sizes: medium and large (combination of faceblanks and nosecups offers three facepiece sizes: the small, medium, and large).

(3) Two plastic lens.

(4) Voice-mitter outlet valve assembly, permitting wearer to communicate understandably and exhaust exhaled air.

(5) Two filter elements enclosed in the face mask, consisting of layers of mineral fiber and charcoal.

(6) Head harness, consisting of two thicknesses of canvas webbing and six adjustable straps.

b. The M-15 Field Protective Mask Carrier is made of olive drab cotton duck and is lined with olive drab cotton cloth. Strips of fiberboard are inserted at critical locations to act as stiffeners. The carrier is irregular in shape, its greatest dimension being approximately 10 inches.

c. Two plastic lens outserts are provided for attachment over the mask lenses to prevent fogging of the lenses in cold weather.

d. The M1 Anti-Dim Set is provided to reduce lens fogging by causing condensed vapor to form an even film on the lenses, thus preventing the distortion of vision which would occur if the vapor condensed in drops on the lenses.

4. SUMMARY OF TESTS. The M-17 Protective Mask was tested by Army aviators in utility and cargo helicopters during flights varying from twenty minutes to three hours. The mask was worn with and without the APH-5 Helmet, and simulated irritant-gas-dispersal missions were conducted during daylight visual flight conditions. During the test it was determined that:

a. A simple explanation and demonstration were sufficient to train individuals to don and doff the mask, and in-flight donning and doffing were accomplished without difficulty.

b. The mask was not compatible with the APH-5 Helmet in the following respects:

(1) When the helmet was properly seated on the head, the lower edges of the helmet forced down the face blank of the mask at the upper ridge of the filter cavity, thereby breaking the seal under the chin.

(2) The buckles between the helmet and the skull significantly reduced the effectiveness of the helmet and could possibly induce a severe injury in the event of impact.

(3) It was impractical to use the helmet chin strap.

(4) The helmet visor could not be used.

(5) Only marginally satisfactory communications could be obtained.

c. Marginally satisfactory communications were obtained through the use of the APH-5 Helmet and the HS-101A/U Headset. The location of the voice-mitter on the mask precluded the use of the helmet boom microphone. In addition, the boom of the headset could not be used with the mask unless one ear cup was worn forward of the ear.

d. Peripheral vision was materially reduced and the width of the space between the eye lenses was objectionable. While wearing the mask, the pilot had to bend his head and body to monitor the instruments and controls in the lower portions of the cockpit and to maintain outside observation.

e. Depth perception was not noticeably affected, and there was no reported impairment of vision resulting from reflections in the eye lens. Some distortion was evident but was overcome after the eyes adjusted to the effects created by the curved lens. Space inside the mask was insufficient to permit a comfortable seating of the frame of the government-issued spectacles on the bridge of the nose.

f. Perspiration accumulated in the chin cup.

g. Simulated ground emergency evacuations by aircraft crew members were accomplished without difficulty while wearing the mask.

h. Maintenance of the mask, other than normal care and cleaning, was not required during the test period.

5. DISCUSSION.

a. This Board tested the E-75R3 Protective Mask and reported the mask unsuitable for use by Army aviators when the APH-5 Helmet is worn (reference 8b). At that time no consideration was given for use of this mask without wearing the APH-5 Helmet.

b. The M-17 Protective Mask was evaluated with the understanding that if at all practical, this mask be considered suitable to meet immediate operational requirements even without use of the APH-5 Helmet. The interim report submitted by this Board (reference 8e) did not provide a comparison between the E-75R3 and the M-17. However, the E-75R3 is considered significantly superior to the M-17 Protective Mask in all respects for interim use by Army air crewmen, when the APH-5 Helmet is not worn.

c. In early July 1961, this Board was afforded the opportunity to examine an E-75R3 Mask which had been modified extensively by the Protective Devices Division, US Army Chemical Research and Development Laboratories, US Army Chemical Center. This mask should permit unrestricted communication with the built-in microphone, provide an adequate field of vision, and allow maximum freedom of movement. Prescription spectacles can be incorporated in the mask and it appears to be compatible with the APH-5 Helmet.

6. CONCLUSIONS.

a. The M-17 Protective Mask is marginally suitable for interim use by Army aviators and aircraft crew members only if the APH-5 Helmet is not worn.

b. The E-75R3 Mask is superior to the M-17 for interim use if the APH-5 Helmet is not worn.

c. The aircrew should include a copilot when a mask is used.

7. RECOMMENDATIONS. It is recommended that:

a. The E-75R3 Mask be adopted for interim use by Army aviators and aircraft crew members.

b. The M-17 Protective Mask be considered for interim use only if the E-75R3 is not available.

c. The interim mask be used only in utility and cargo helicopters with the helicopter-mounted irritant-gas disperser to meet immediate operational or emergency requirements during daylight visual operation.

d. Immediate action be taken to expedite the development of the modified E-75R3 Protective Mask as indicated in paragraph 5c above.

8. REFERENCES.

a. Technical Manual, TM 3-4240-202-15, "Operation and Organization Field and Depot Maintenance, Mask, Protective, Field, M-17," Department of the Army, October 1959.

b. Letter, ATBG-DT Project Nr AVN 5060, US Army Aviation Board, 31 August 1960, subject: "Project Nr AVN 5050, Abbreviated Service Test of the Helicopter-Mounted Irritant Gas Disperser, E-16R1."

c. Report of Test, Project Nr AVN 661, "Service Test of Helicopter Pilot's Protective Mask Type E-75R3," 28 October 1960.

d. Letter, ATDEV-6 422, Headquarters, US Continental Army Command, 17 January 1961, subject: "Protective Mask for Helicopter Pilots Use (Task 4C80-02-031-04)."

e. Telecon between Major Kennedy, USAAVNBD and Lt Col Bowlby, Headquarters, USCONARC, on 14 March 1961, pertaining to the evaluation of the M-17 Protective Mask.

f. US Army Aviation Board Message, ATBG-DT 4-29, 13 April 1961.

g. Letter, ATDEV-6 422, Headquarters, US Continental Army Command, 20 April 1961, subject: "Helicopter Pilot's Protective Mask."

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h. DF, ATBG-DG, US Army Aviation Board, 17 July 1961, subject: "M-17 Protective Mask."

9. COORDINATION. This report has been coordinated with the US Army Aviation School, Fort Rucker, Alabama.

FOR JACK L. MARINELLI
Colonel, Artillery
President